



## ***Synergia LLC***

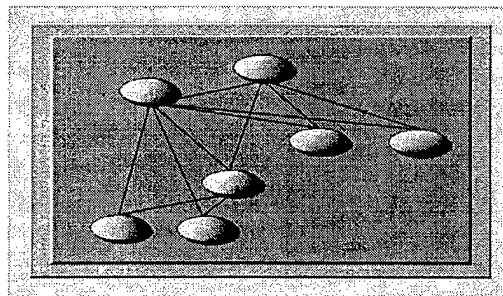
*2400 Broadway, Suite 203*

*Redwood City, CA 94063-1551*

*Phone: (650) 569-4999*

*Fax: (650) 569-4990*

*World Wide Web: [www.synergia.com](http://www.synergia.com)*



# **Computational Models of Human Organization Dynamics**

## **Quarterly Report #2**

Sponsored by  
Defense Advanced Research Projects Agency  
Information Systems Office  
Computational Models of Human Organization Dynamics  
ARPA Order No. E495  
Program Code No. 6S10  
Issued by DARPA/CMO under Contract #MDA972-97-C-0001

**Period Covered: 7/16/97 – 10/15/97**

## ***Reporting Period***

This is the second quarterly report for the project: Computational Models of Human Organization Dynamics. This report covers the period from 7/16/97 through 10/15/97.

## ***Progress During Reporting Period***

During this project period we have made significant progress on the specification and initial development of a suite of software technologies to enable analysts to define, validate, and explore the implications of models of organization dynamics. We divide these technologies into three tool suites, which we are beginning to implement in the form of interfaces. Taken together, these technologies will allow users to develop an understanding of an organization's dynamics based on the results of monte carlo simulations. Our conception of these three technology suites is as follows.

The **mapper's interface suite** will provide facilities for users to enter descriptions of joint practices and the agents that may engage in those practices. This information is described at three levels: raw data (from interviews or observations), descriptions of that data organized as practices of agents, and then formal specifications of the practices in terms of action propositions, that is, in terms of situation descriptions, procedures, and criteria which those procedures attempt to maintain or satisfy in those situations. The **modeler's interface suite** will provide facilities for the conversion of action propositions into computational form suitable for simulation, that is, into the form of action schemata. For example, criteria in action propositions are encoded as monitors that check situation data to determine whether a running procedure should be halted, suspended, or advised to adapt execution results to better satisfy the criteria. The procedure descriptions in action propositions are encoded as procedures, augmented with locations that monitors can cause jumps to (i.e., to advise by restarting computation under new conditions). The **analysis interface suite** will support experimentation to validate models, projective studies to develop implications of validated models, and visualization and analysis of simulation results. Specifically, it allows a user to select a structure within the model to vary (an agent, an agent practice, or a component of a practice), identify the range of values/instantiations that the varied structure may take on, and define the measurements to be taken during simulation (the item/structure to measure, and the conditions under which it is measured). The analysis suite contains the execution management controls to set up and control monte-carlo simulation runs.

We have also begun to develop a realistic crisis scenario – a Noncombatant Evacuation Operation. This scenario will act as a guide to the development of tools, provide material for testing our life-cycle conception of organizational analysis, and support a project demonstration. A Pentagon planning expert, and a special operations expert, are reviewing/critiquing our scenario and helping us develop it.

### ***Plans for Next Quarter***

We plan to divide our emphasis between the continued development of the computational tools just described, and the development of the demonstration scenario.

We also anticipate holding a project review with Dr. Flank.

### ***Equipment Purchases***

There were no equipment purchases this quarter.

### ***Personnel Matters***

There have been no changes in the key personnel proposed for this project – Drs. Fehling and Courand.

### ***Meetings, Important Exchanges and Decisions***

There have been no meetings with DARPA representatives during the reporting period. We have made preliminary contact with senior staff of the EPA, for the Western U.S., and hope to explore crisis response with them.

Our emphasis as we began this project was on the development of a discrete-event simulation engine, suitable for running monte-carlo studies of organizational dynamics. Our research has revealed to us that this is not the most important goal to accomplish first. To this end, we now see our work as focusing on the methodology that surrounds monte-carlo simulation, and on the development of tools (our three interface suites) to support the methodology. Once these tools are better defined and prototyped, we will be able to define requirements and specifications for the simulation engine. To put this another way, the simulation engine should be optimized for the kinds of (psycho-social) model validation and exploration exercises we intend.

### ***Problems***

We have no problems to report at this time. We foresee no substantial risks to our ability to complete this project successfully, on time, and on budget.

### ***Related Accomplishments***

As we reported in the previous quarterly report, we continue to work in the municipal planning domain. We are also contracted to work on the design of a health care clinic.

These contracts provide tests of our theory, methods, and commitments as reflected in the tools we are developing for this project.

### ***Fiscal Status***

The table below summarizes the fiscal status for this contract and our projected spending over the next quarters.

Amount Currently Provided	\$374,813.
Expenditures and Commitments to Date	\$225K
Manhours Planned, Actual	Planned = 1050      Actual = 1523
Estimated Funds/Qtr to Complete Work	\$110K, \$40K
Estimated Date of Completion	2/28/98

### ***Distribution of this Report***

The following individuals/organizations comprise the distribution list for quarterly reports on this contract.

DARPA/ISO  
Attn: Dr. Steven Flank  
3701 N. Fairfax Dr.  
Arlington, VA 22203-1714

Defense Technical Information Center  
Attn: OCC  
8725 John J. Kingman Rd., Suite 0944  
Ft. Belvoir, VA 22060-6218

DARPA/ISO  
Attn: Janice Pritchard  
3701 N. Fairfax Dr.  
Arlington, VA 22203-1714